ONTARIO MINISTRY OF ENVIRONMENT
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1969

OPERATING SUMMARY

OWEN SOUND

water pollution control plant

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O WATER
COMMISSION

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD
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1969

Owen Sound : water pollution
control plant.
81785

Water management in Ontario

Ontario
Water Resources
Commission

135 St.Clair Ave.W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

D Caverly

D.S. Caverly,
General Manager.

D McTavish

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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JUN 26 1970
ONTARIO WATER
RESOURCES COMMISSION

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135 St. Clair Avenue West
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OWEN SOUND
water pollution control plant

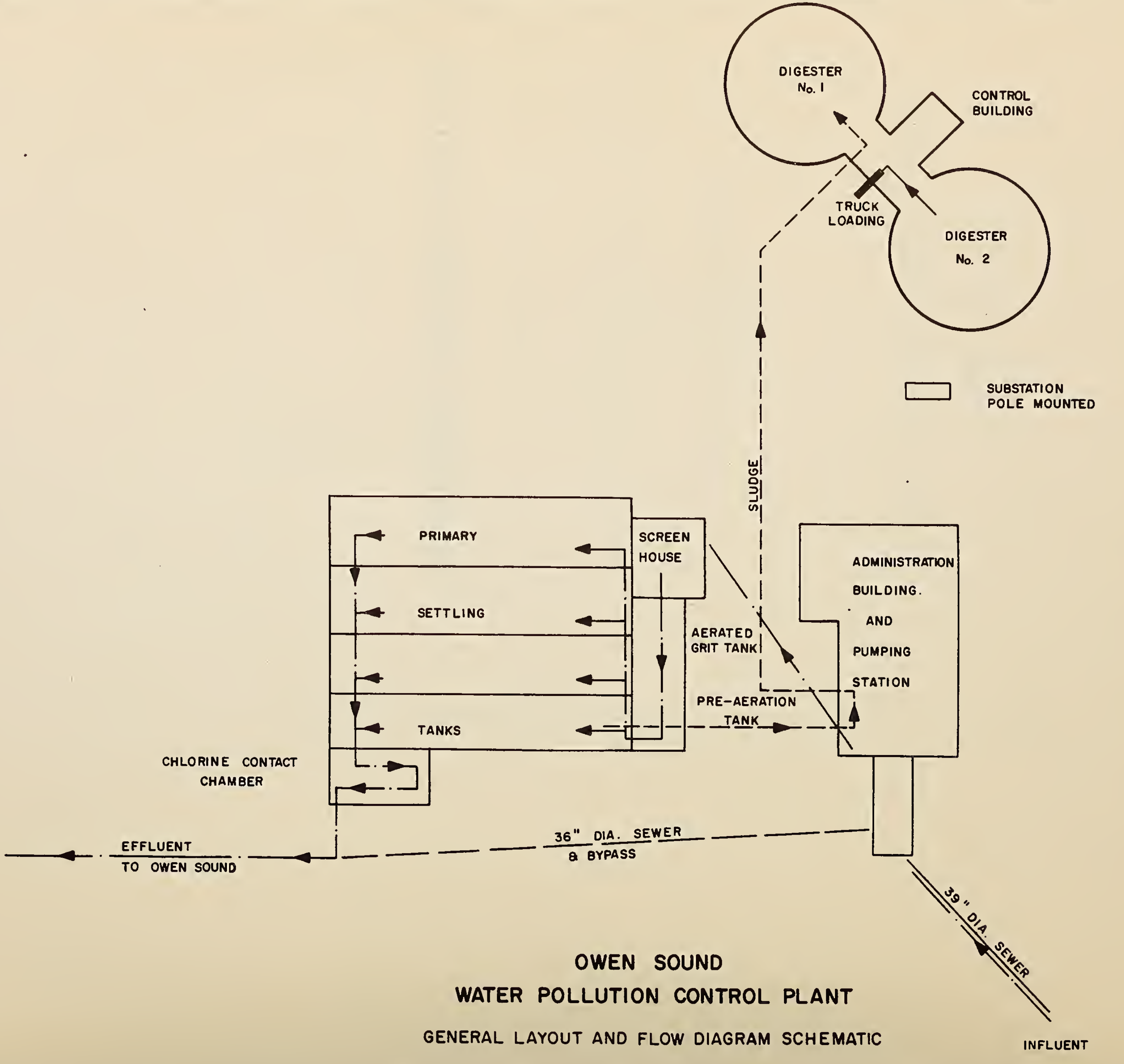
operated for

THE CITY OF OWEN SOUND

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY



OWEN SOUND
WATER POLLUTION CONTROL PLANT
GENERAL LAYOUT AND FLOW DIAGRAM SCHEMATIC

DESIGN DATA

PROJECT NO.	2-0069-60	TREATMENT	Primary
DESIGN FLOW	3.0 mgd	DESIGN POPULATION	25,000
BOD - Raw Sewage	180 mg/l	SS - Raw Sewage	200 mg/l
- Removal	40%	- Removal	65%

SEWAGE PUMPING STATION

Screening

- 1 3/4" spacing

Pumps

Type: Worthington
Size: Three 3150 gpm @ 33' tdh
(One diesel standby)

PRIMARY TREATMENT

Comminution

Type: Barminutor
Size: One Model C (36")

Grit Removal

Type: Aerated
Size: One 18½ X 13 X 12' (18,000 gal)
Retention: 8.6 min

Pre-aeration Tank

Size: One 23' 9" X 13 X 12'
(23,400 gal)
Retention: 11.2 min

Air Supply

Type: Sutorbilt
Size: Two 408 scfm @ 6 psi

Primary Sedimentation

Type: Rex Linkbelt
Size: Two 78 X 32 X 12½' (388,000 gal)
Retention: 3.11 hr
Loading: Surface, 600 gal/ft^2/day
Weir, 8,260 gal/ft/day

CHLORINATION

Type: W & T
Size: One 2000 lb/day

Chlorine Contact Chamber

Size: One 31 X 14 X 8' (21,700 gal)
Retention: 11.2 min

OUTFALL

- 828' to Owen Sound

SLUDGE HANDLING

Digestion System - Two-stage

Primary --
Type: PFT with one Sutorbilt compressor
Size: One 40' dia x 25' swd (31,400 cu ft or 0.196 mil gal)
Loading: 2.75 lb/cu ft/mo

Secondary --
Size: One 40' dia x 24½' swd (30,800 cu ft or 0.192 mil gal)
Total Loading: 1.88 lb/cu ft/mo

WEST SIDE PUMPING STATION

One - 3916 gpm Chicago Pump
Two - 1000 gpm Smart-Turner
Standby - Diesel generator

'69 REVIEW

During 1969, modifications to the West Side pumping station included an additional pump with a capacity of more than 3800 gallons per minute, and a generator which will operate the station in the event of power failures. With these modifications, the pumping station is expected to handle the heavy flows more easily.

No additions to enlarge capacity were made at the plant. As a result, plant staff still had problems with hydraulic overloading.

From the graphs, it can be seen that 80% of the time the plant is most likely operating above the design capacity. The average flow has remained constant for the last year.

EXPENDITURES

The total operating cost for treating 1475 million gallons of sewage in 1969 was $53,549.66. Unit costs were $36.30 per million gallons treated and five cents per pound of BOD removed.

PLANT FLOWS and CHLORINATION

The total flow for the year was 1475.2 million gallons, with an average daily flow of four million gallons. The maximum and minimum daily flows were 8.8 million gallons in November and 2.1 million gallons in July.

An average of 2696 pounds of chlorine was used per month. The operation used 21.9 pounds of chlorine per million gallons of flow at an average dosage of 2.2 mg/l. This maintained an average residual of 0.5 mg/l in the final effluent.

PLANT EFFICIENCY

The average influent BOD and suspended solids were 104 mg/l and 224 mg/l respectively. The average effluent BOD and suspended solids were 37 mg/l and 36 mg/l respectively, giving an average removal of 64% BOD and 84% suspended solids. A total of 1243 cu. ft. of grit was removed during the year, for an average of 104 cu. ft. of grit removed for each one million gallons of sewage treated.

SLUDGE DIGESTION

Just over three million gallons of raw sludge were pumped to the digesters during 1969. The average monthly volume of 258,000 gallons contained 7.3% total solids and 47% volatile solids.

Sludge totalling 1,495,000 gallons was removed from the digesters and hauled away. The average monthly volume of 125,000 gallons contained 8.5% total solids and 28% volatile solids.

CONCLUSIONS

1. The plant operated above the hydraulic design capacity 85% of the time, and increasing the pumping capacity of the West Side pumping station aggravated this problem. If a combined sewer separation program is financially impossible, immediate consideration should be given to expanding the plant's capacity.

2. Due to the high flows throughout the year, grit facilities did not operate effectively. As a result, large amounts of grit were passed on to the primary clarifiers and subsequently pumped to the digester. This continues to be a problem.

3. The influent and effluent BOD and suspended solids were similar to the previous year's values. As a result, the plant operated at the same efficiency as in 1968.

PROJECT COSTS

NET CAPITAL COST (Final)		$1,468,243.18
DFDUCT - Payments from Municipality	$ 30,758.65	
- Portion financed by CMHC/MDLB (Final)	996,392.74	1,027,151,39
Long Term Debt to OWRC		$ 441,091.79

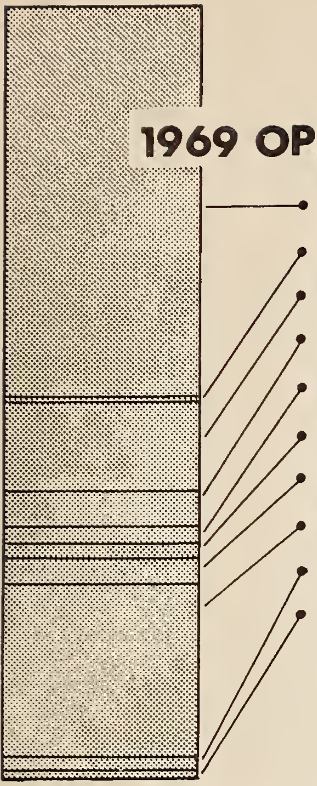
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 78,480.88

Net Operating	$ 53,549.66
Debt Retirement	8,901.00
Reserve	7,634.86
Interest Charged	24,694.46
TOTAL	$ 94,779.98

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 57,217.75
Deposited by Municipality	7,634.86
Interest Earned	3,100.47
	$ 67,953.08
Less Expenditures	12,406.78
Balance @ December 31, 1969	$ 55,546.30

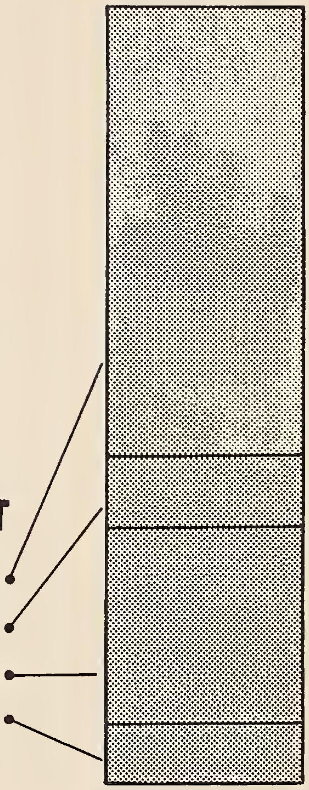
1969 OPERATING COSTS



PAYROLL	52 %
FUEL	1 %
POWER	11 %
CHEMICALS	4 %
GENERAL SUPPLIES	2%
EQUIPMENT	2%
REPAIRS & MAINTENANCE	3 %
SUNDRY	22%
WATER	2%
TRAVEL	1 %

TOTAL ANNUAL COST

NET OPERATING	57 %
DEBT RETIREMENT	9 %
INTEREST	26 %
RESERVE FUND	8 %



Yearly Operating Costs

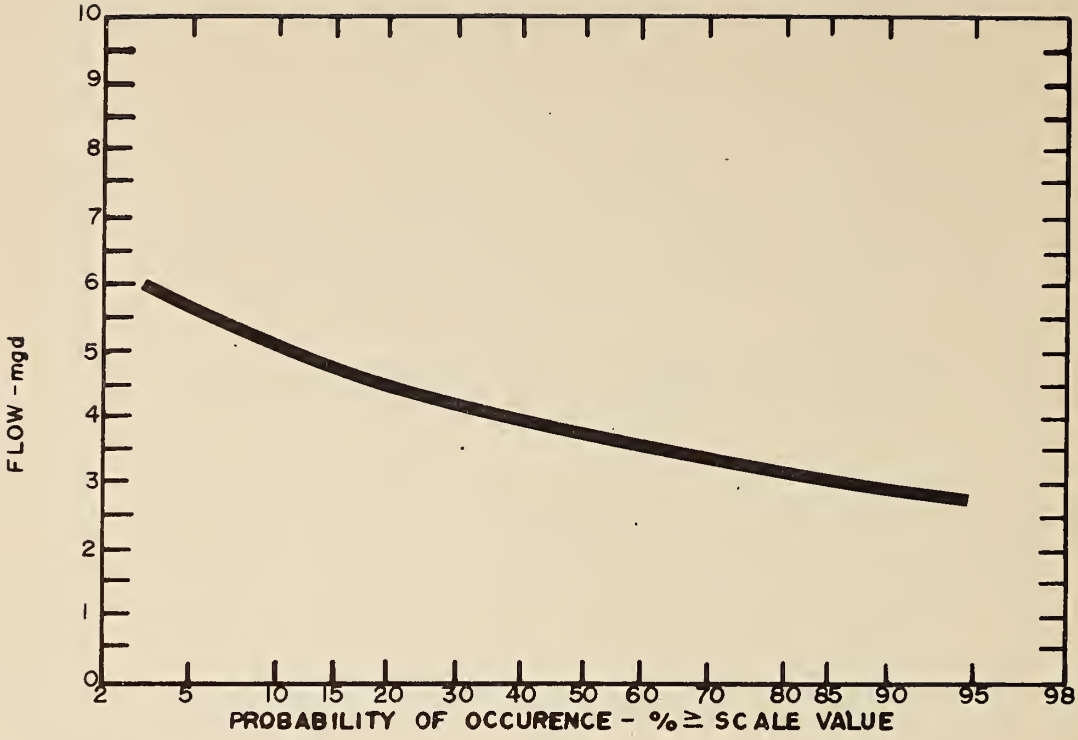
YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	1236.31	$34,109.32	$27.59	6 cents
1966	1166.20	36,736.62	31.52	6 cents
1967	1415.50	48,655.69	34.37	3 cents
1968	1442.50	48,466.97	33.60	4 cents
1969	1475.20	53,549.66	36.30	5 cents

Monthly Operating Costs

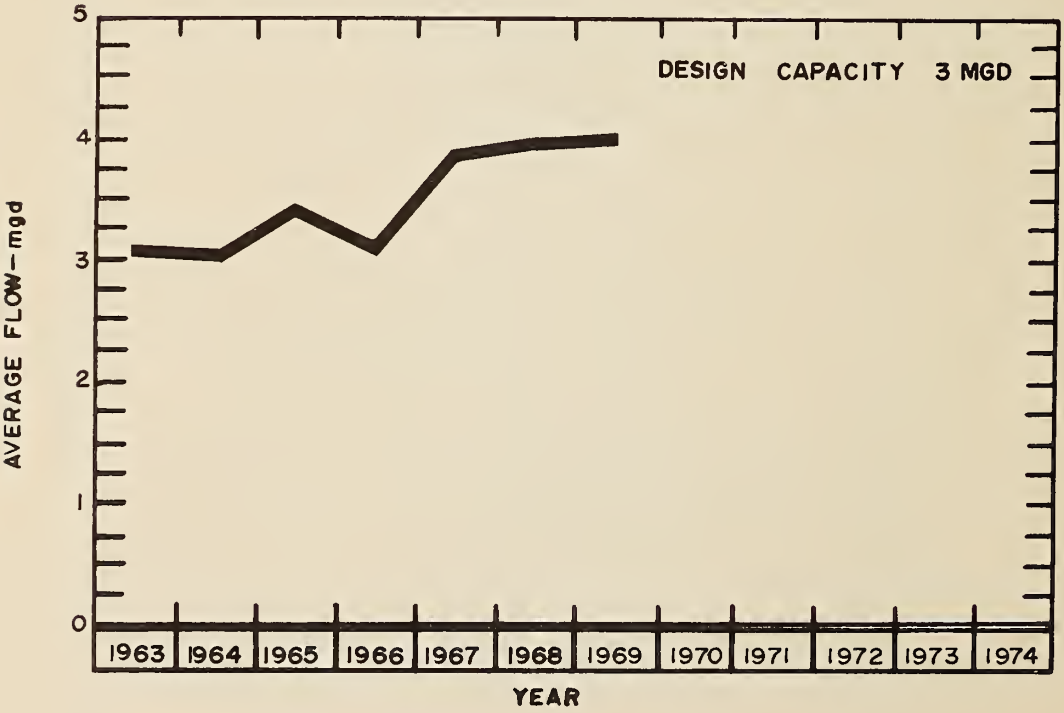
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAIN-ENANCE	SUNDRY*	WATER	TRAVEL
JAN	4576.66	2526.31	361.58	69.65	573.71	-	33.51	-	-	873.00	104.25	34.65
FEB	4327.73	2056.10	330.76	-	482.51	-	93.36	-	238.08	986.22	85.65	55.05
MAR	4020.62	1903.52	418.49	-	487.58	-	141.47	-	-	952.48	82.58	34.50
APR	3897.71	1774.84	335.30	119.40	481.13	-	161.82	-	-	937.47	87.75	-
MAY	4134.74	1877.26	335.43	-	540.55	-	94.25	-	48.18	1012.76	165.56	60.75
JUNE	3903.16	1707.57	329.32	59.70	526.47	-	69.01	-	216.29	842.39	101.45	50.96
JULY	5312.10	1634.58	356.74	397.30	465.73	1.54	99.06	898.00	574.83	762.46	93.66	28.20
AUG	4893.57	3088.59	-	100.03	425.32	-	119.47	73.40	129.91	841.22	90.73	24.90
SEPT	4023.98	2189.07	-	-	466.77	-	102.84	29.92	340.00	772.03	96.50	26.85
OCT	3470.79	2029.41	-	-	442.82	-	43.69	28.01	-	803.63	98.03	25.20
NOV	4999.57	2048.28	-	-	463.56	2090.34	134.90	-	30.45	84.85	125.74	21.45
DEC	5989.03	1867.11	-	-	582.77	-	228.12	-	115.71	2009.14	139.53	46.65
TOTAL	53549.66	24702.64	2467.62	746.08	5938.92	2091.88	1321.50	1029.33	16935.45	11877.65	1271.43	409.16

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $10249.02

PROCESS DATA

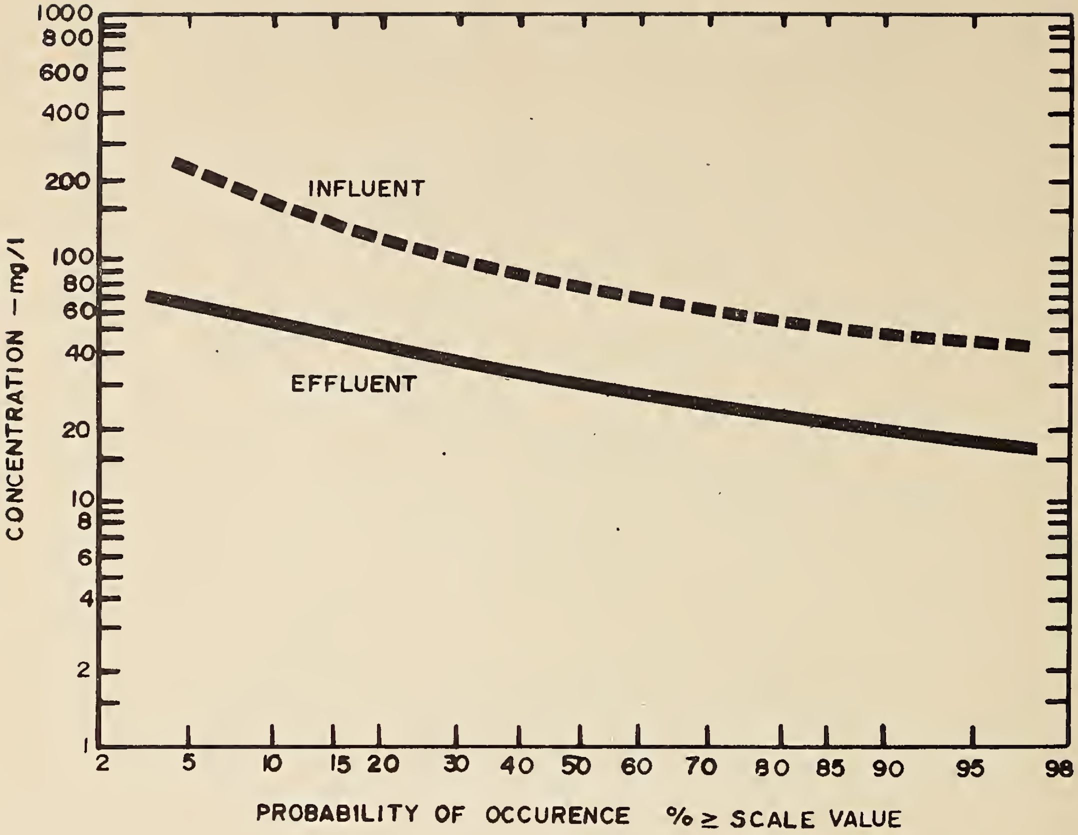

FLOW - mgd
0
1
2
3
4
5
6
7
8
9
10
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

FLOWS

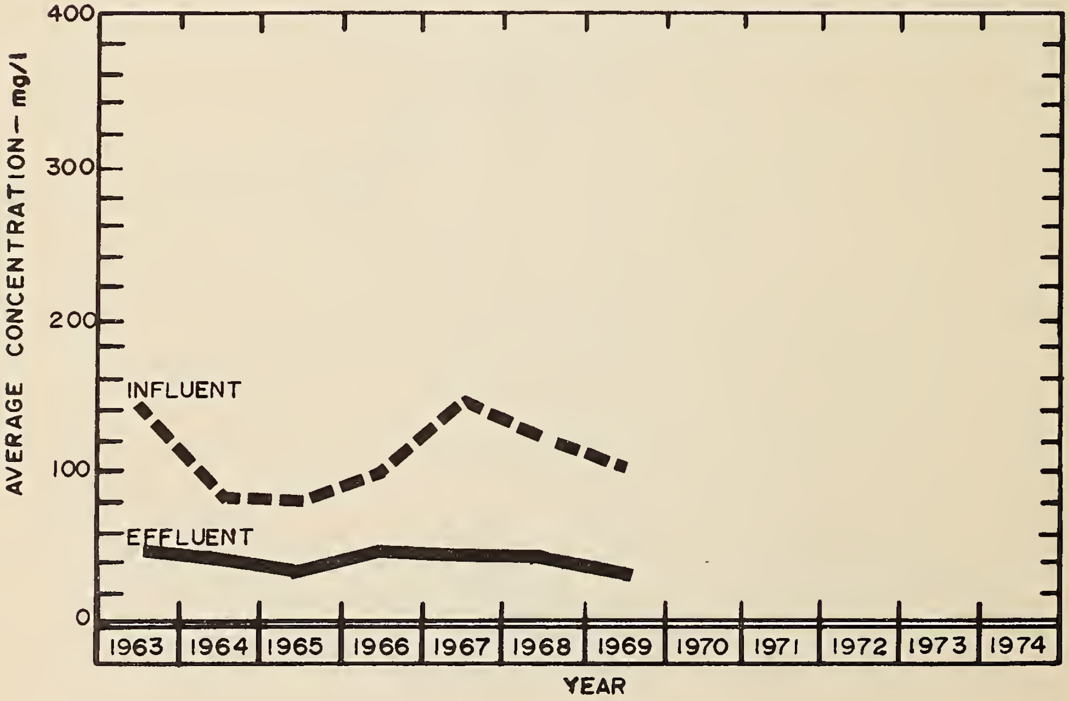

AVERAGE FLOW - mgd
0
1
2
3
4
5
DESIGN CAPACITY 3 MGD
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

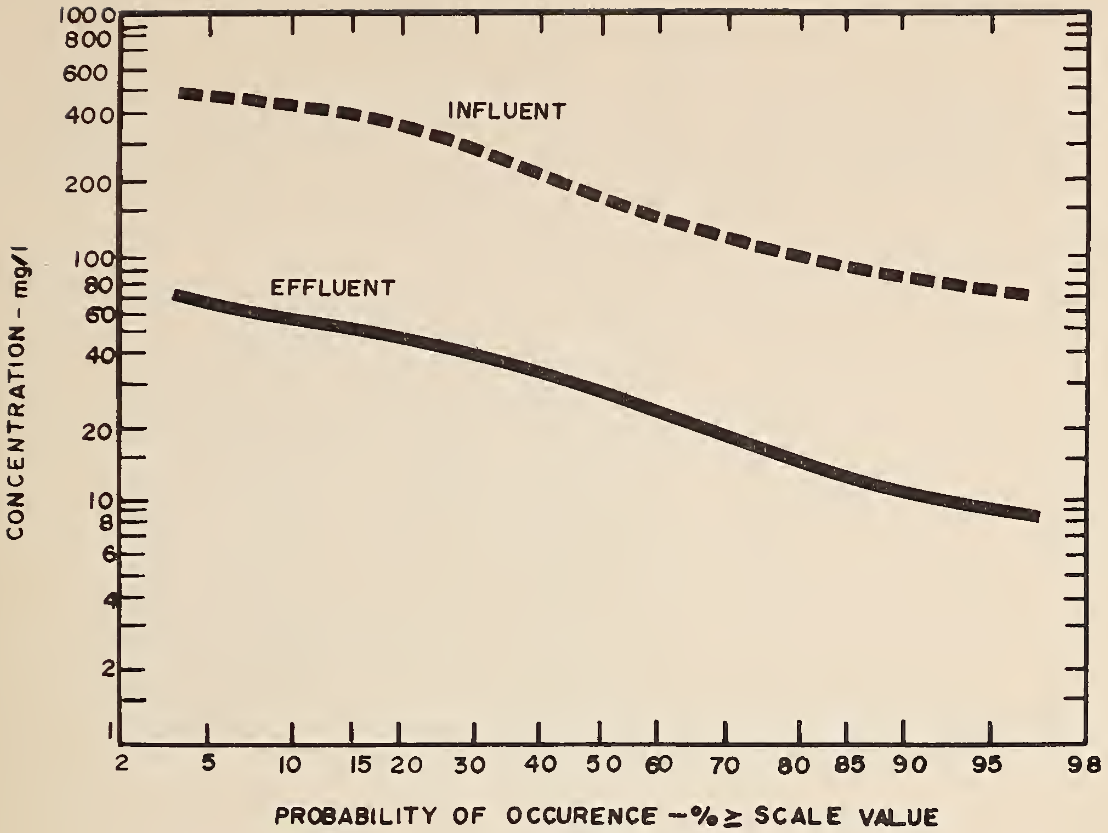
PLANT FLOWS and CHLORINATION

MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	132.9	4.3	8.2	3.1	2.94	2.2
FEB	106.8	3.8	4.9	3.4	2.38	2.2
MAR	137.9	4.5	6.6	3.3	3.19	2.3
APR	153.9	5.1	6.2	4.1	3.18	2.1
MAY	142.1	4.5	7.3	3.4	2.16	1.5
JUNE	121.6	4.1	4.9	3.7	2.54	2.1
JULY	94.9	3.1	4.9	2.1	2.14	2.3
AUG	115.2	3.7	5.9	3.2	2.52	2.2
SEPT	86.5	3.2	4.2	2.4	2.86	3.3
OCT	113.4	3.7	5.0	2.4	2.93	2.6
NOV	144.2	4.8	8.8	3.3	2.54	1.8
DEC	125.8	4.1	5.4	3.1	2.99	2.4
TOTAL	1475.2	-	-	-	32.37	-
AVERAGE	-	4.0	-	-	2.70	2.2

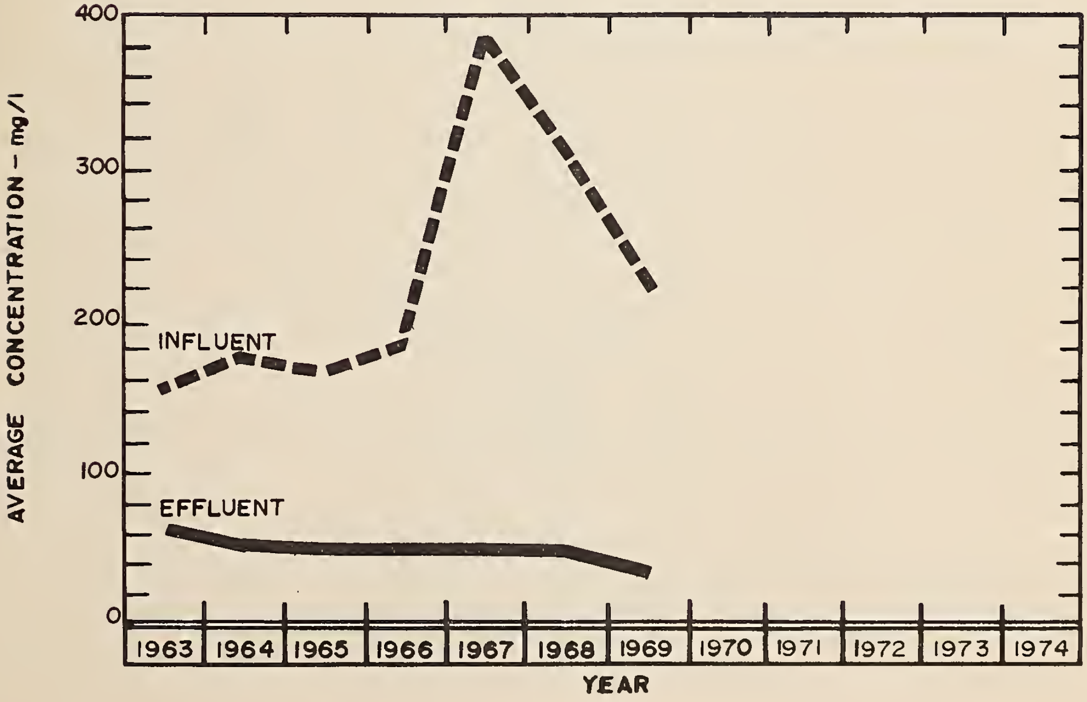


BIOCHEMICAL OXYGEN DEMAND



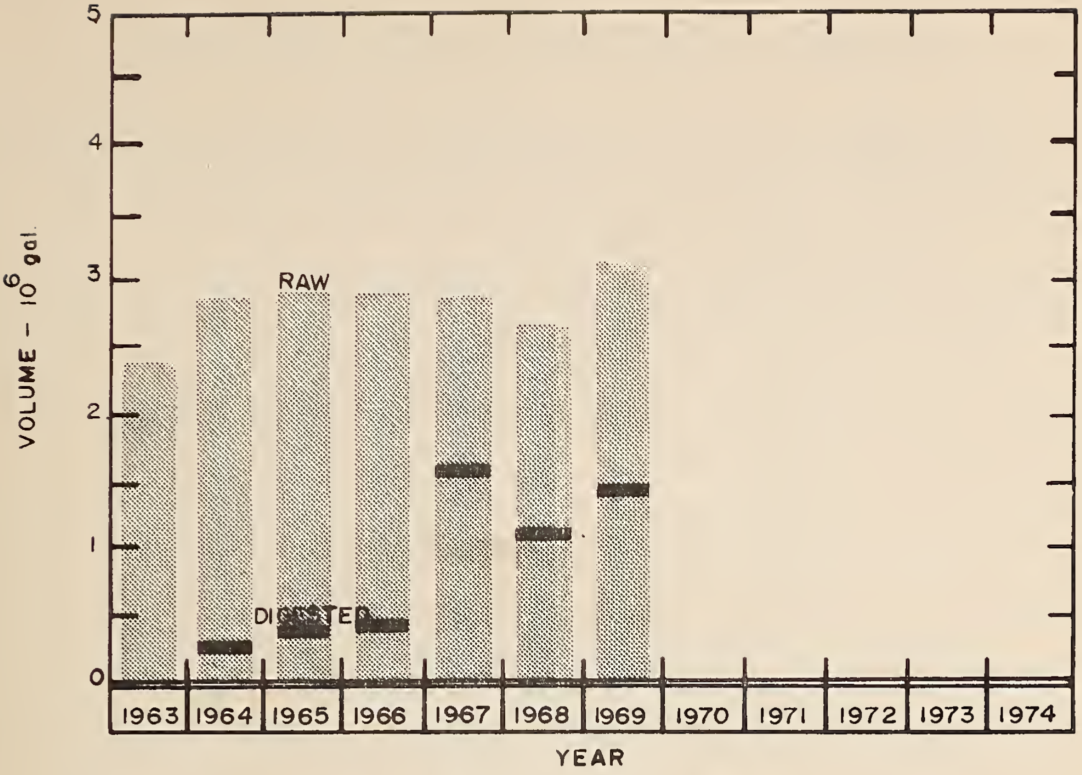


SUSPENDED SOLIDS

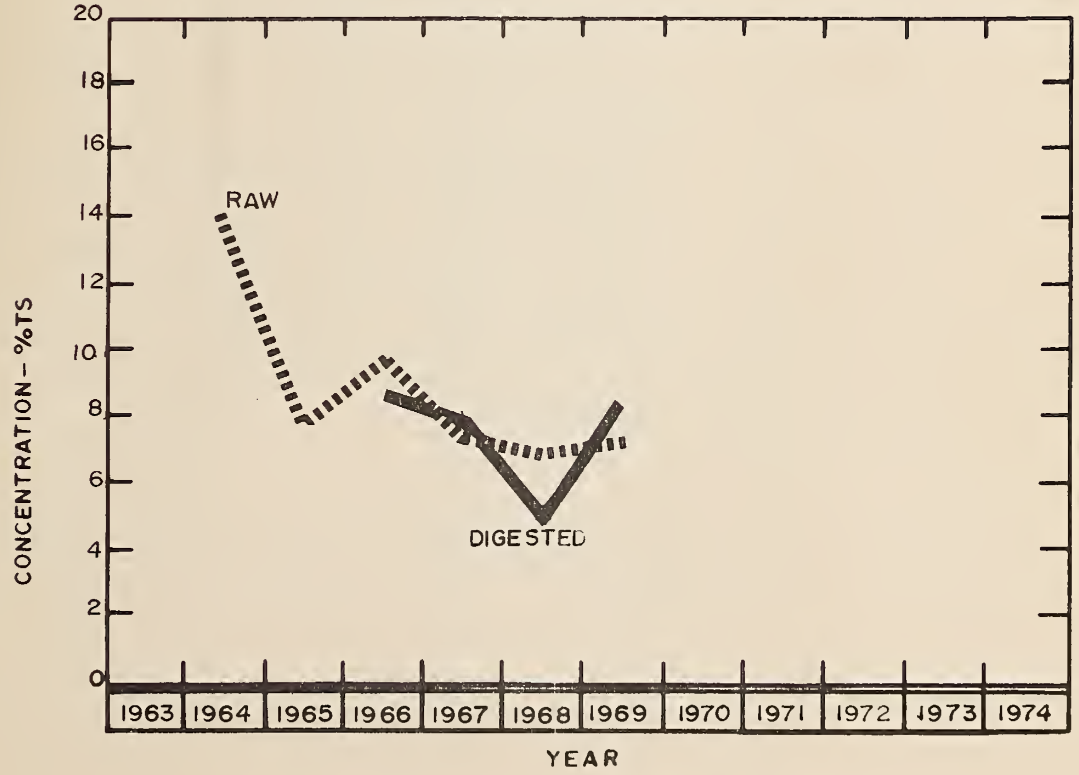


PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION		
	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	cu ft
JAN	85	40	53	60.	115	30	74	113.	25
FEB	135	39	71	102.	195	23	88	184.	60
MAR	53	41	22	16.	249	50	80	274.	73
APR	78	23	71	85.	177	28	84	229.	46
MAY	102	35	66	95.	208	27	87	257.	156
JUNE	65	36	45	35.	189	34	82	188.	122
JULY	200	34	83	158.	324	31	90	278.	132
AUG	52	19	63	38.	325	36	89	333.	117
SEPT	155	43	72	97.	420	40	90	329.	85
OCT	110	40	64	79.	270	45	83	255.	151
NOV	65	29	55	52.	95	37	61	94.	181
DEC	150	68	55	103.	120	50	58	88.	95
TOTAL	–	–	–	–	–	–	–	–	1243
AVERAGE	104	37	64	77.	224	36	84	218.	104


VOLUME - 10^6 gal.
0
1
2
3
4
5
RAW
DIGESTED
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

DIGESTION


CONCENTRATION - %TS
0
2
4
6
8
10
12
14
16
18
20
RAW
DIGESTED
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
YEAR

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	2.62	6.2	54	1.02	5.6	31	-	-	0	606
FEB	2.36	4.5	61	1.20	5.5	29	-	-	0	713
MAR	2.64	7.2	44	1.53	6.9	29	-	-	0	906
APR	2.58	7.8	36	1.20	9.4	23	-	-	0	710
MAY	2.66	6.5	47	1.32	10.2	28	-	-	0	783
JUNE	2.45	7.6	37	1.41	13.1	26	-	-	0	834
JULY	2.64	8.8	45	1.40	11.8	26	-	-	0	828
AUG	2.53	7.2	44	1.25	9.7	26	-	-	0	745
SEPT	2.54	6.6	50	1.32	7.6	24	-	-	0	791
OCT	2.66	7.8	53	1.14	7.0	29	-	-	0	679
NOV	2.56	10.1	42	1.20	6.8	31	-	-	0	712
DEC	2.66	7.7	46	.96	8.0	28	-	-	0	568
TOTAL	30.90	-	-	14.95	-	-	-	-	0	8875
AVERAGE	2.58	7.3	47	1.25	8.5	28	-	-	0	740

Date Due

Water management in Ontario